Rapid Watershed Assessment
Big Fork
(MN) HUC: 09030006

DRAFT

Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help land–owners and local leaders set priorities and determine the best actions to achieve their goals.

Introduction

The Big Fork 8-digit Hydrological Unit Code (HUC) Subbasin is located in the Northern Lakes and Forests and Northern Minnesota Wetlands ecoregions of Northern Minnesota.This watershed is 1,326,975 acres in size. Nearly 60 percent of the watershed is state owned or managed land.

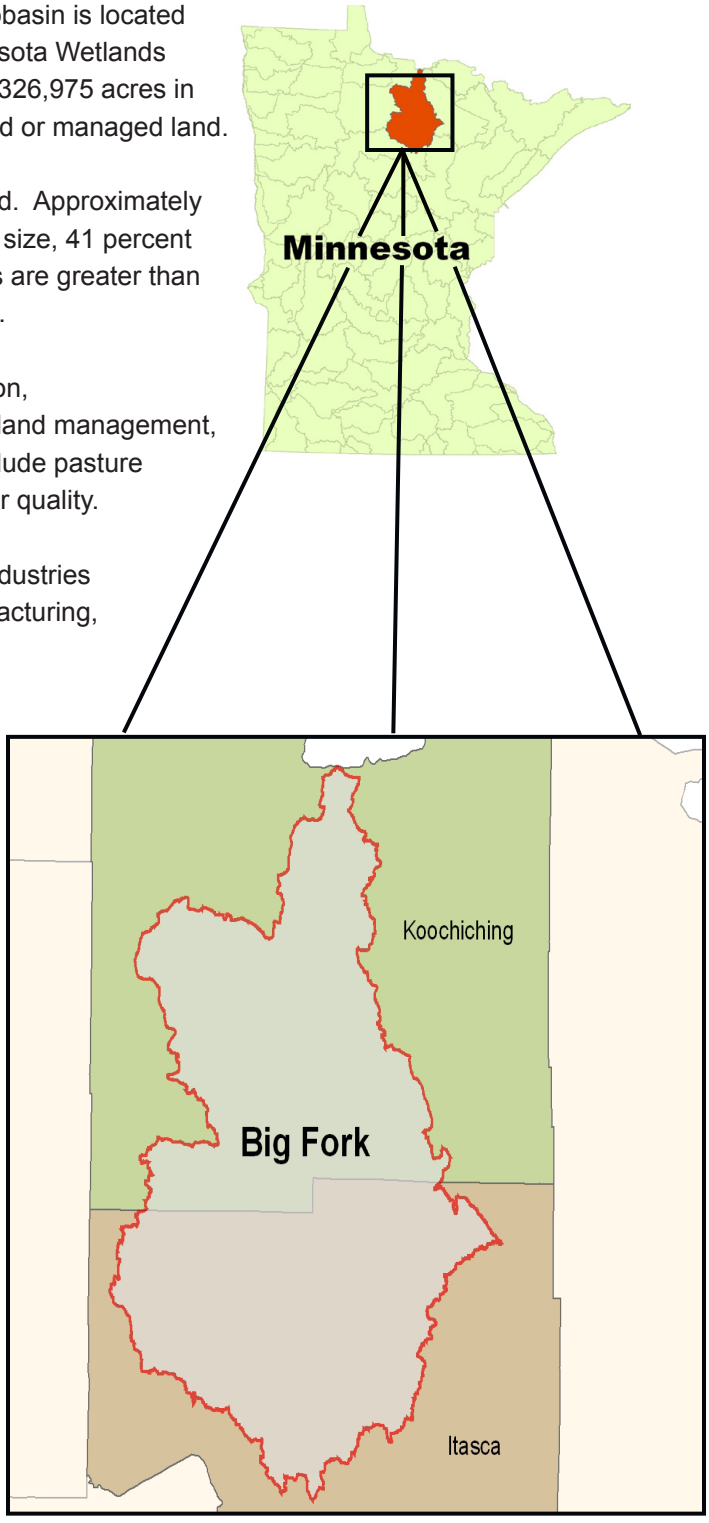
Estimates indicate 257 Farms in the Big Fork watershed. Approximately 55 percent of the operations are less than 180 acres in size, 41 percent are 180 to 1,000 acres in size, and the remaining farms are greater than 1,000 acres. Average farm size in the basin is 90 acres.

The main resource concerns in the basin are soil erosion, management of excessive wetness, wetland and woodland management, and the short growing season. Additional concerns include pasture management, dryness in sandy soils, and surface water quality.

As with many areas of Northern Minnesota, principal industries include forest product harvesting, forest product manufacturing, farming and tourism.

The Big Fork River watershed is the second largest watershed, in terms of size, in the Minnesota portion of the Rainy River Basin.

The greater Rainy River Basin is home to some of Minnesota's finest forest and water resources. Voyageurs National Park and the Boundary Waters Canoe Area Wilderness (BWCA) are located within the greater basin, as are several of the state's most famous walleye fisheries and top-notch trout streams.



County Totals

County	*Acres in HUC*	*% HUC*
Koochiching	677,974	51.1%
Itasca	649,001	48.9%
Total acres:	**1,326,975**	**100%**

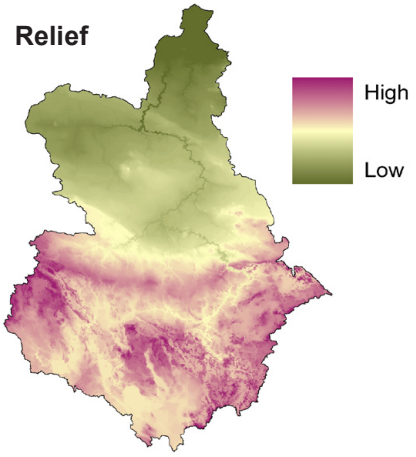
Physical Description

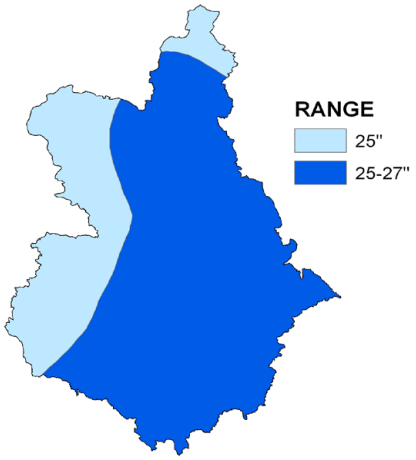
The Big Fork watershed includes four Ecological Classification System subsections. These are the Chippewa Plains and St. Louis Moraines to the north with Agassiz Lowlands and Little Fork-Vermilion Uplands to the south.

Average elevation in the watershed is 1235 feet above sea level, with the highest values being in the Southern portions of the watershed. The Big Fork River watershed has its headwaters in Itasca and Koochiching Counties. Its waters flow into Koochiching County eventually reaching the Rainy River approximately 1 mile east of the County Road 1 intersection with Hwy 11.

Precipitation in the watershed ranges from 25 to 27 inches annually. Most lands within this watershed are not highly erodible, and the soils are predominantly hydric. Much of the land in the subbasin is not suited or poorly suited to agricultural uses.

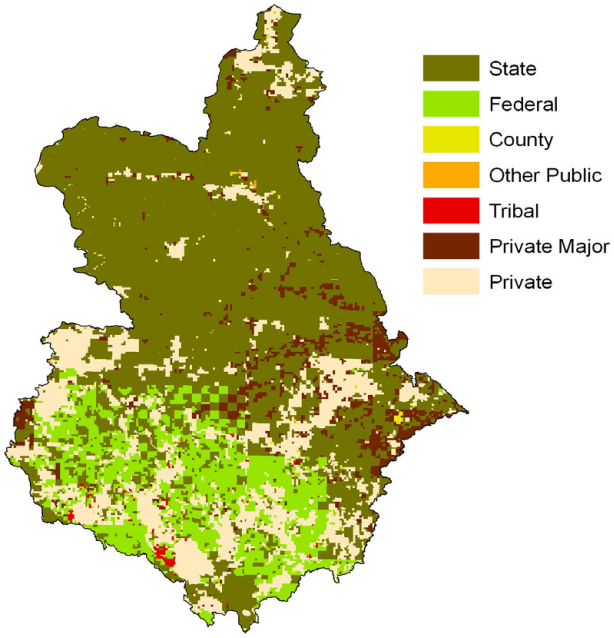
Development pressure is negligible throughout this subbasin, with occasional lands being parceled out for timber production or recreational use.





Ownership[1]

Ownership Type	Acres	% of HUC
Conservancy	-	-
County	2,355	0.2
Federal	193,833	14.6
State	790,236	59.6
Other Public	530	0.0
Tribal	4,945	0.4
Private Major	78,755	5.9
Private	256,320	19.3
Total Acres:	**1,326,975**	**100**

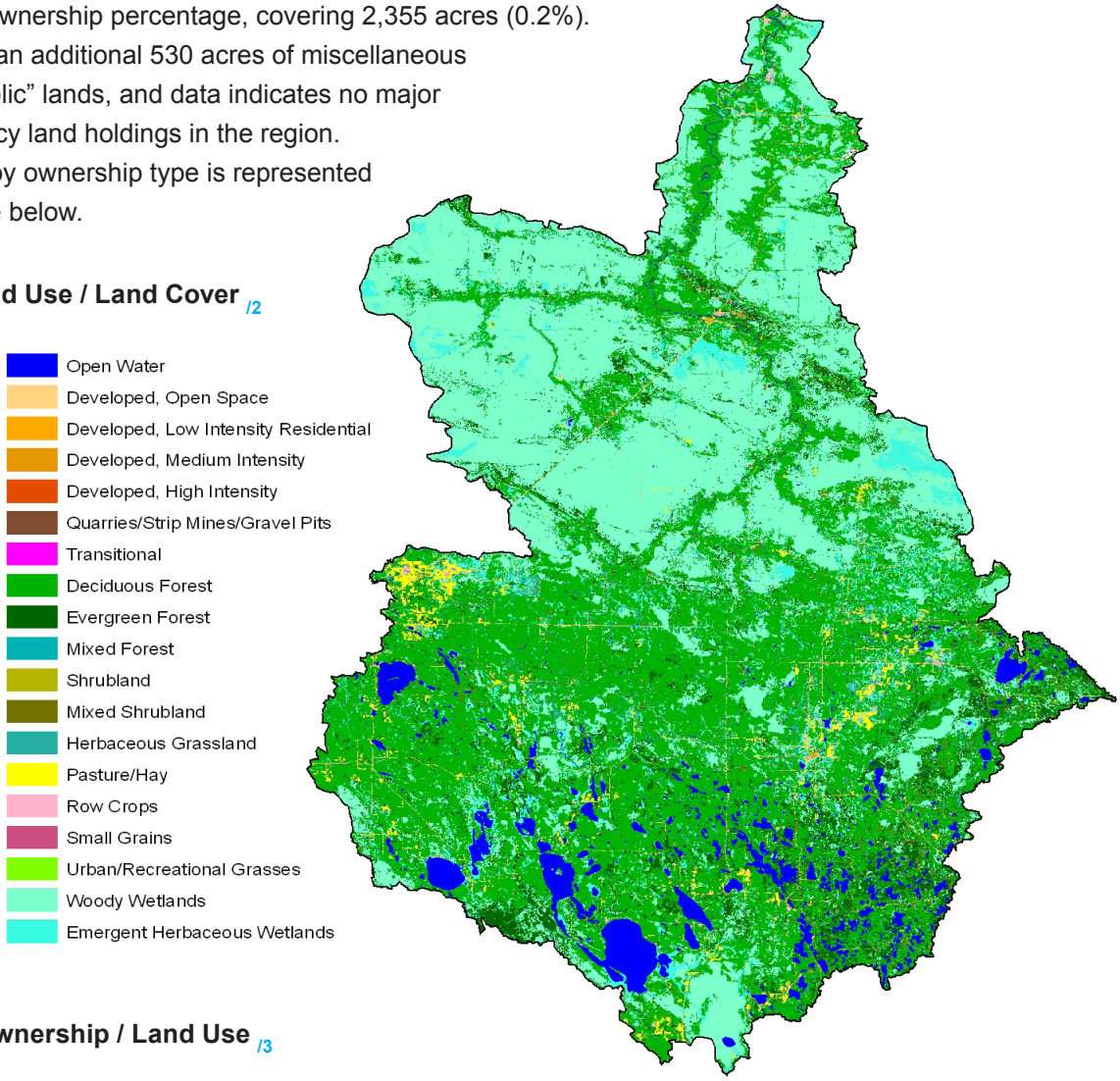


* Ownership totals derived from 2007 MN DNR GAP Stewardship and are the best suited estimation of land stewardship available on a statewide scale at time of publication. See the bibliography section of this document for further information.

Ownership / Land Use

The Big Fork Watershed covers an area of 1,326,975 acres. Nearly sixty percent of the land in the watershed is owned or managed by State entities (790,236 acres). The second largest ownership type is Private, with 256,320 acres (19.3%), followed by Federal with 193,833 acres (14.6%), Private Major (Corporate) with 78,755 acres (5.9%), and Tribal with 4,945 acres (0.4%). County lands account for the smallest ownership percentage, covering 2,355 acres (0.2%). There are an additional 530 acres of miscellaneous "Other Public" lands, and data indicates no major conservancy land holdings in the region. Land use by ownership type is represented in the table below.

Land Use / Land Cover /2



Ownership / Land Use /3

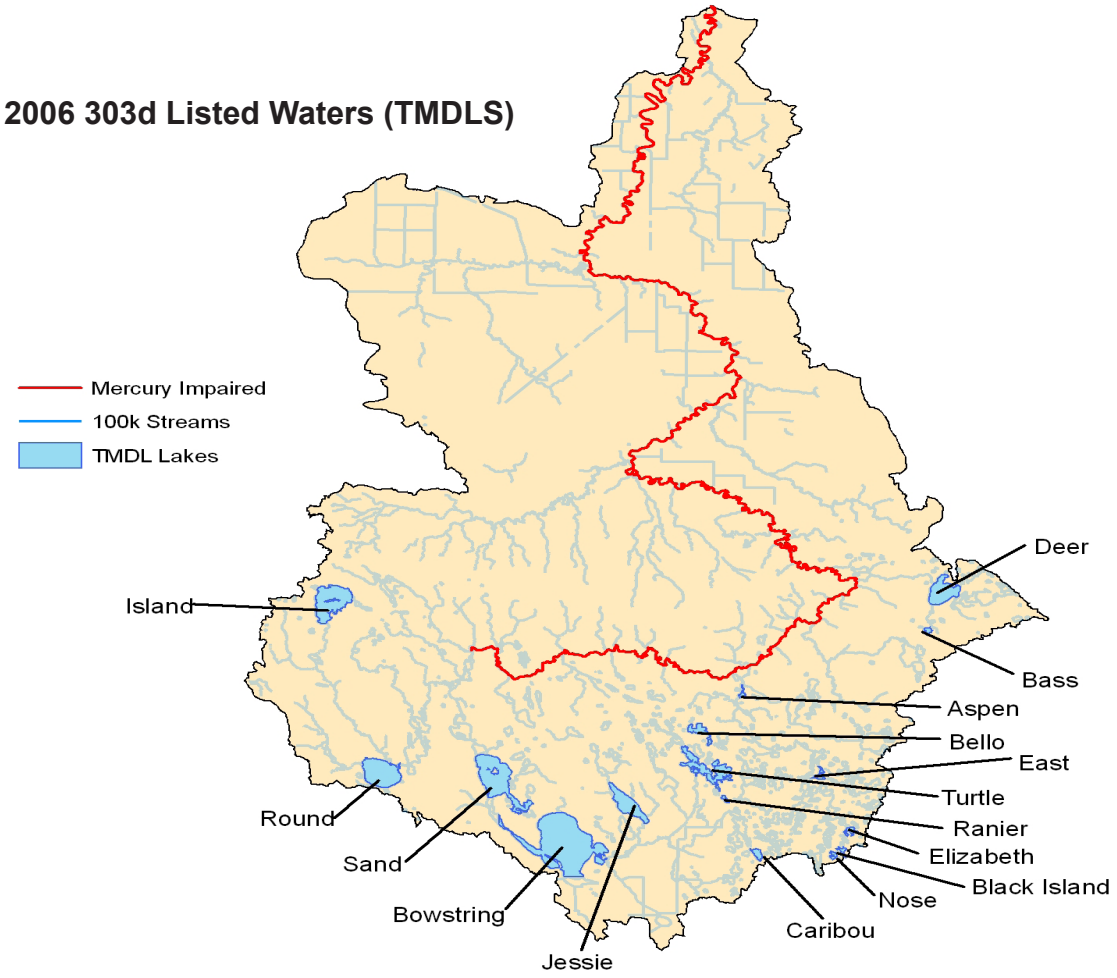
	Public		Private**		Tribal			
Landcover/Use	**Acres**	**% Public**	**Acres**	**% Private**	**Acres**	**% Tribal**	**Total Acres**	**Percent**
Forest	467,110	35.2%	196,133	14.8%	2,980	0.2%	666,224	50.2%
Grass, etc	8,326	0.6%	23,897	1.8%	26	0.0%	32,249	2.4%
Orchards	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Row Crops	1,100	0.1%	3,039	0.2%	19	0.0%	4,158	0.3%
Shrub etc	11,264	0.8%	6,480	0.5%	42	0.0%	17,786	1.3%
Wetlands	481,078	36.3%	50,911	3.8%	820	0.1%	532,808	40.2%
Residential/Commercial	5,032	0.4%	8,518	0.6%	80	0.0%	13,630	1.0%
Open Water*	12,701	1.0%	46,447	3.5%	976	0.1%	60,123	4.5%
* ownership undetermined			** includes private-major					
Watershed Totals:	**986,609**	**74.35%**	**335,425**	**25.3%**	**4,943**	**0.4%**	**1,326,975**	**100%**

Physical Description (continued)

			cu. ft/sec
Stream Flow Data	USGS 05132000 BIG FORK RIVER AT BIG FALLS, MN	**Total Avg.**	733.75
		May – Sept. Yield	958
Stream Data[4] *(*Percent of Total HUC Stream Miles)*		**Miles**	**Percent**
	Total Miles – Major (100K Hydro GIS Layer)	1,965.1	---
	Total Miles –303d/TMDL Listed Streams	167.8	8.54%
Riparian Land Cover/Land Use[5] *(Based on a 100-foot buffer on both sides of all streams in the 100K Hydro GIS Layer)*	**Land Use Type**	**Acres**	**Percent**
	Forest	22,393	47.4%
	Grain Crops	0	0.0%
	Grass, etc	998	2.1%
	Orchards	0	0.0%
	Row Crops	224	0.5%
	Shrub etc	543	1.2%
	Wetlands	12,465	26.4%
	Residential/Commercial	549	1.2%
	Open Water*	10,044	21.3%
	Total Buffer Acres	**47,216**	---
Crop and Pastureland Land Capability Class[6] *(Croplands & Pasturelands Only) (1997 NRI Estimates for Non-Federal Lands Only)*	**1** – slight limitations	0	0%
	2 – moderate limitations	28,100	44%
	3 – severe limitations	4,200	7%
	4 – very severe limitations	18,400	29%
	5 – no erosion hazard, but other limitations	0	0%
	6 – severe limitations; unsuitable for cultivation; limited to pasture, range, forest	13,100	21%
	7 – very severe limitations; unsuitable for cultivation; limited to grazing, forest, wildlife habitat	0	0%
	8 – miscellaneous areas; limited to recreation, wildlife habitat, water supply	0	0%
	Total Crop & Pastureland	**63,800**	**---**
Irrigated Lands[7] *(1997 NRI Estimates for Non-Federal Lands Only)*	**TYPE OF LAND**	**ACRES**	**% of Irrigated Lands** / **% of HUC**
	Cultivated Cropland	**0**	**0%** / **0%**
	Uncultivated Cropland	**0**	**0%** / **0%**
	Pastureland	**0**	**0%** / **0%**
	Total Irrigated Lands	**0**	**0%** / **0%**

Assessment of Waters[8]

Section 303(d) of the Clean Water Act states that water bodies with impaired use(s) must be placed on a state's impaired waters list. A water body is "Impaired" or polluted when it fails to meet one or more of the Federal Clean Water Act's water quality standards. Federal Standards exist for basic pollutants such as sediment, bacteria, nutrients, and mercury. The Clean Water Act requires the Minnesota Pollution Control Agency (MPCA) to identify and restore impaired waters.



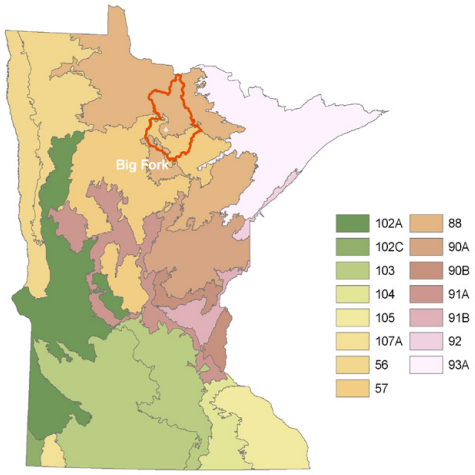
Waterbody Name	Impairment	Waterbody Name	Impairment
Big Fork River Bear R to Rainy R	Mercury	Elizabeth	Mercury
Big Fork River Sturgeon R to Bear R	Mercury	Caribou	Mercury
Big Fork River Reilly Brook to Sturgeon R	Mercury	Ranier	Mercury
Big Fork River Deer Cr to Caldwell Br	Mercury	Aspen	Mercury
Big Fork River Moose Brook to Coon Cr	Mercury	Turtle	Mercury
Big Fork River Coon Cr to Deer Cr	Mercury	Bello	Mercury
Big Fork River Caldwell Br to Reilly Br	Mercury	Jessie	Mercury, Excess nutrients
Bass	Mercury	Bowstring	Mercury
Deer	Mercury	Sand	Mercury
Black Island	Mercury	Round	Mercury
Nose	Mercury	Island	Mercury
East	Mercury		

Common Resource Areas

The Big Fork Watershed encompasses two Common Resource Areas, CRA 88.1 and 57.1. [9]

57.1 Northern Minnesota Till Moraine: Rolling glacial moraine and associated outwash with short, choppy and complex slopes. Soils are generally loamy with some clayey and sandy soils included. Organic soils occur in depressions. Land use is cropland, pasture timber and recreation. Numerous lakes occur in this region. Main crops are small grain, soybeans and forage crops. Resource concerns include improved drainage for crop production, grazing management of forest and grassland, water and wind erosion and water quality impacts.

88.1 Northern Minnesota Glacial Lake Basins: Nearly level to gently sloping areas formed in lake washed till, lacustrine and organic soil material. Generally the soils are silty, clayey and loamy with small amounts of sandy and gravelly soils on beach ridges. Timber land is the main use. Scattered cropland and grazing land for beef and dairy are present. Cropland is used mostly for small grain, silage and hay. Resource concerns include management of excessive wetness, short growing season, pasture management, and water quality.



Only the major CRA units are described above.
For further information, go to:
http://soils.usda.gov/survey/geography/cra.html

Soils / Geology

Soil distribution in the Big Fork watershed varies regionally and is most easily summarized according to ecological classification system subsection descriptions.

Chippewa Plains: Soils range from sandy to clayey, depending on parent material. Most fall in the Alfisol, Entisol,or Histosol orders. On moraines, most soils are loamy well to moderately well drained and areclassified as Boralfs. Soils on the outwash plain are dominantly sandy and excessively welldrained. They are classified as Psamments (young, undeveloped sandy soils).

St Louis Moraines: Loamy calcareous soils make up about 75 percent of the soils in this subsection (Department of Soil Science, University of Minnesota, 1971). Excessively well drained outwash sands account for another 10 to 15 percent and poorly drained soils account for about 3 percent. Thesoils are classified as Boralfs (well drained soils developed under forest vegetation), Aqualfs (wet soils developed under forest vegetation), Hemists (moderately decomposed organic soils),and Psamments (sandy, poorly developed well drained soils), with Boralfs most common (Cummins and Grigal 1981).

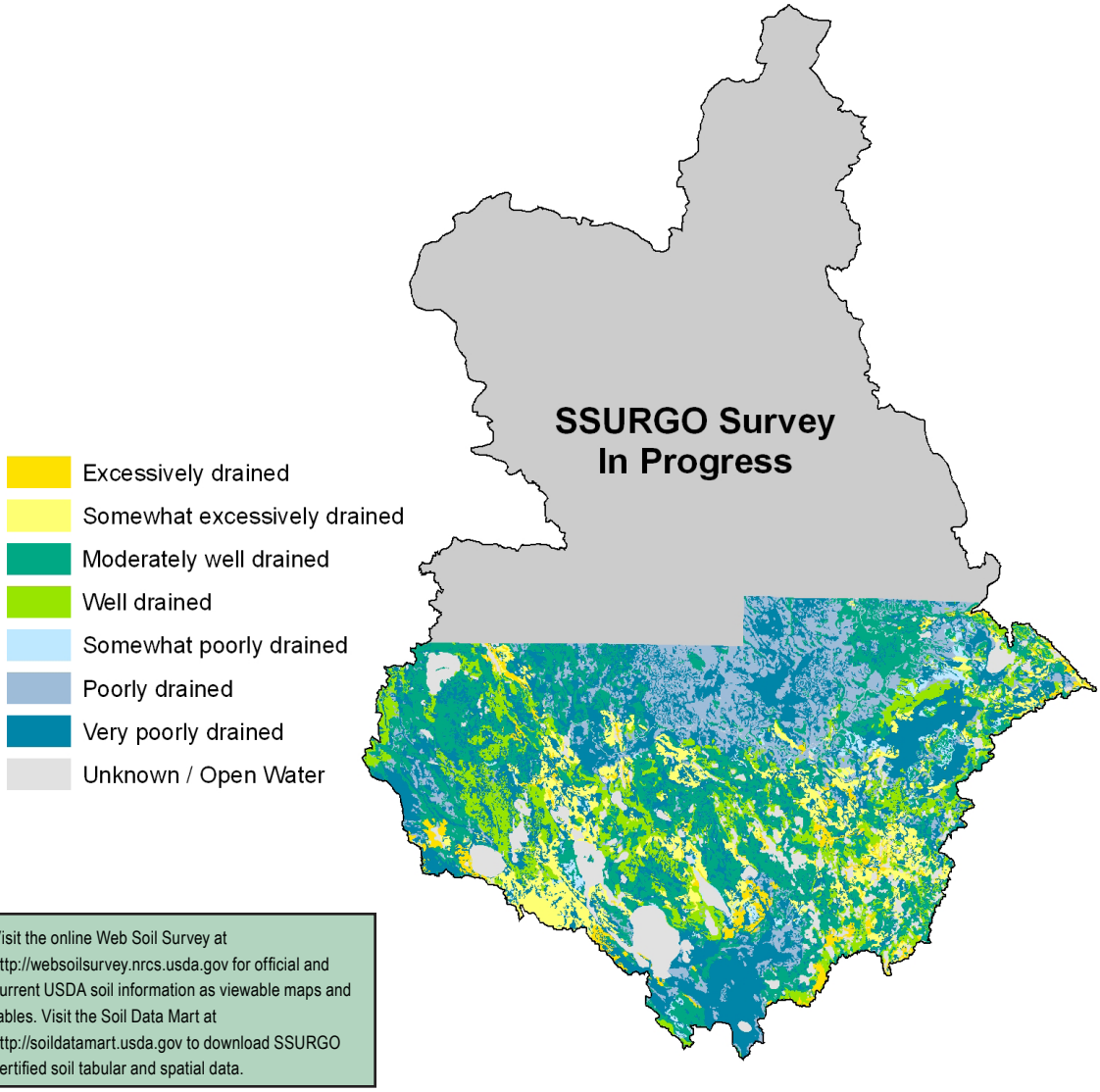
Aggassiz Lowlands: Soils in this subsection are predominantly organic (Department of Soil Science, University of Minnesota 1980c, 1981b). There are a greater percentage of organic soils in the center of the lake basin, with increased amounts of poorly drained mineral soils near the edges. About 75 percent of the soils are peats in this portion of the basin. Peat depths can exceed 15 feet. Soils are classified primarily as Hemists, Aqualfs, and Aquents (Anderson and Grigal 1984). Hemists occupy the center of the lake basin, whereas Aqualfs and Aquents are along the margins of the basin.

Littlefork / Vermillion Uplands: Soils in this subsection are primarily moderately well to poorly drained mineral soils formed from clayey lake-laid sediments or loamy to clayey glacial till. Organic soils are common, but do not dominate the landscape (as they do to the west in the Agassiz Lowlands). Peat depths vary from shallow to deep (1 to 15 feet thick). Soils are classified primarily as Aqualfs (wet forested soils), Aquents (wet undeveloped soils), Boralfs (well to moderately well drained forested soils), and Hemists (moderately decomposed peat) (Anderson and Grigal 1984).

Drainage Classification

Drainage class (natural) refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil.

Seven classes of natural soil drainage are recognized–excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined in the “Soil Survey Manual.”



Visit the online Web Soil Survey at http://websoilsurvey.nrcs.usda.gov for official and current USDA soil information as viewable maps and tables. Visit the Soil Data Mart at http://soildatamart.usda.gov to download SSURGO certified soil tabular and spatial data.

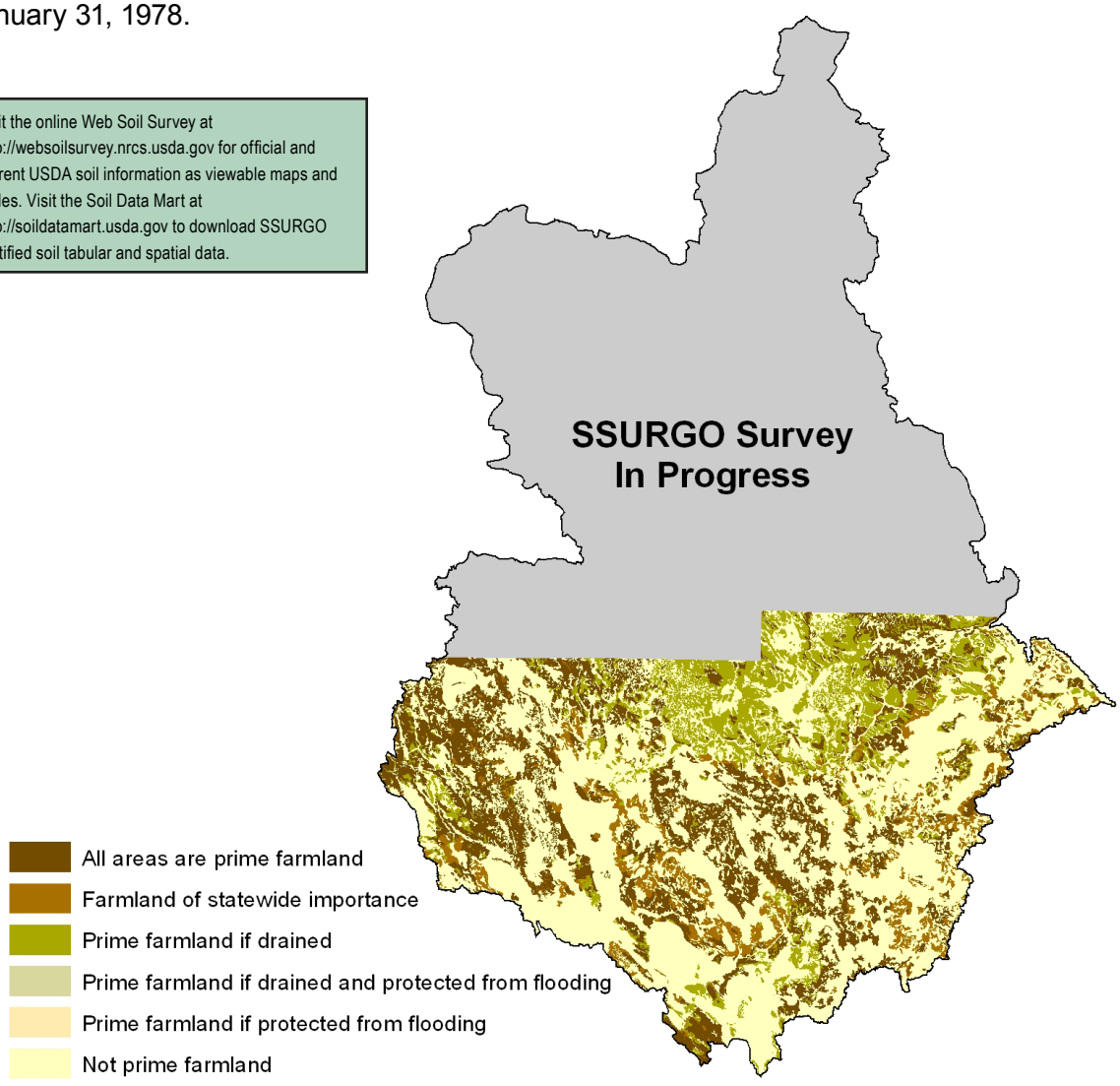
Farmland Classification

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland.

Farmland classification identifies the location and extent of the most suitable land for producing food, feed, fiber, forage, and oilseed crops.

NRCS policy and procedures on prime and unique farmlands are published in the Federal Register, Vol. 43, No 21, January 31, 1978.

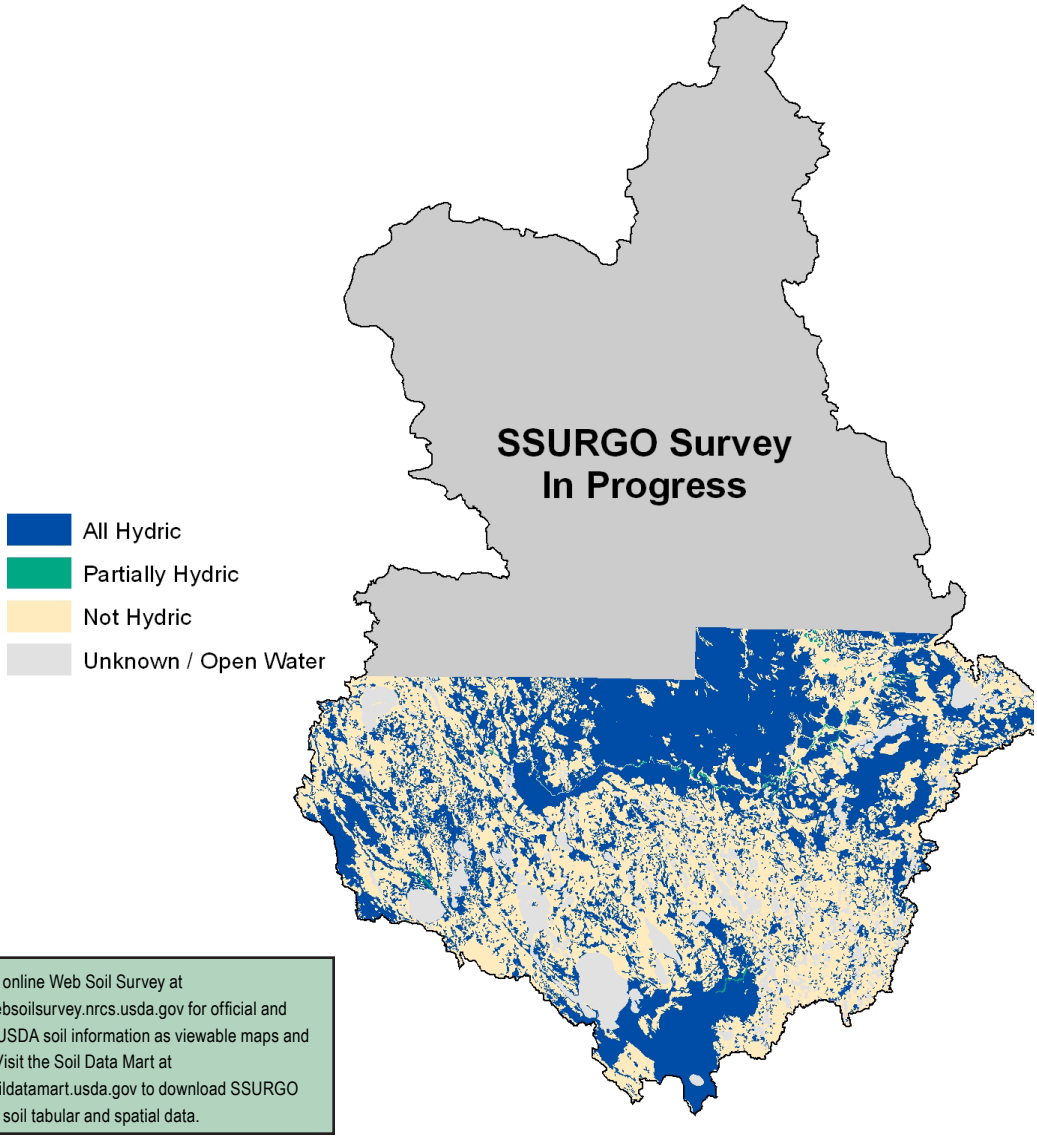
Visit the online Web Soil Survey at http://websoilsurvey.nrcs.usda.gov for official and current USDA soil information as viewable maps and tables. Visit the Soil Data Mart at http://soildatamart.usda.gov to download SSURGO certified soil tabular and spatial data.



Hydric Soils

This rating provides an indication of the proportion of the map unit that meets criteria for hydric soils. Map units that are dominantly made up of hydric soils may have small areas, or inclusions of nonhydric soils in the higher positions on the landform. Map units of dominantly non–hydric soils may therefore have inclusions of hydric soils in the lower positions on the landform.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as “soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part” (Federal Register 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

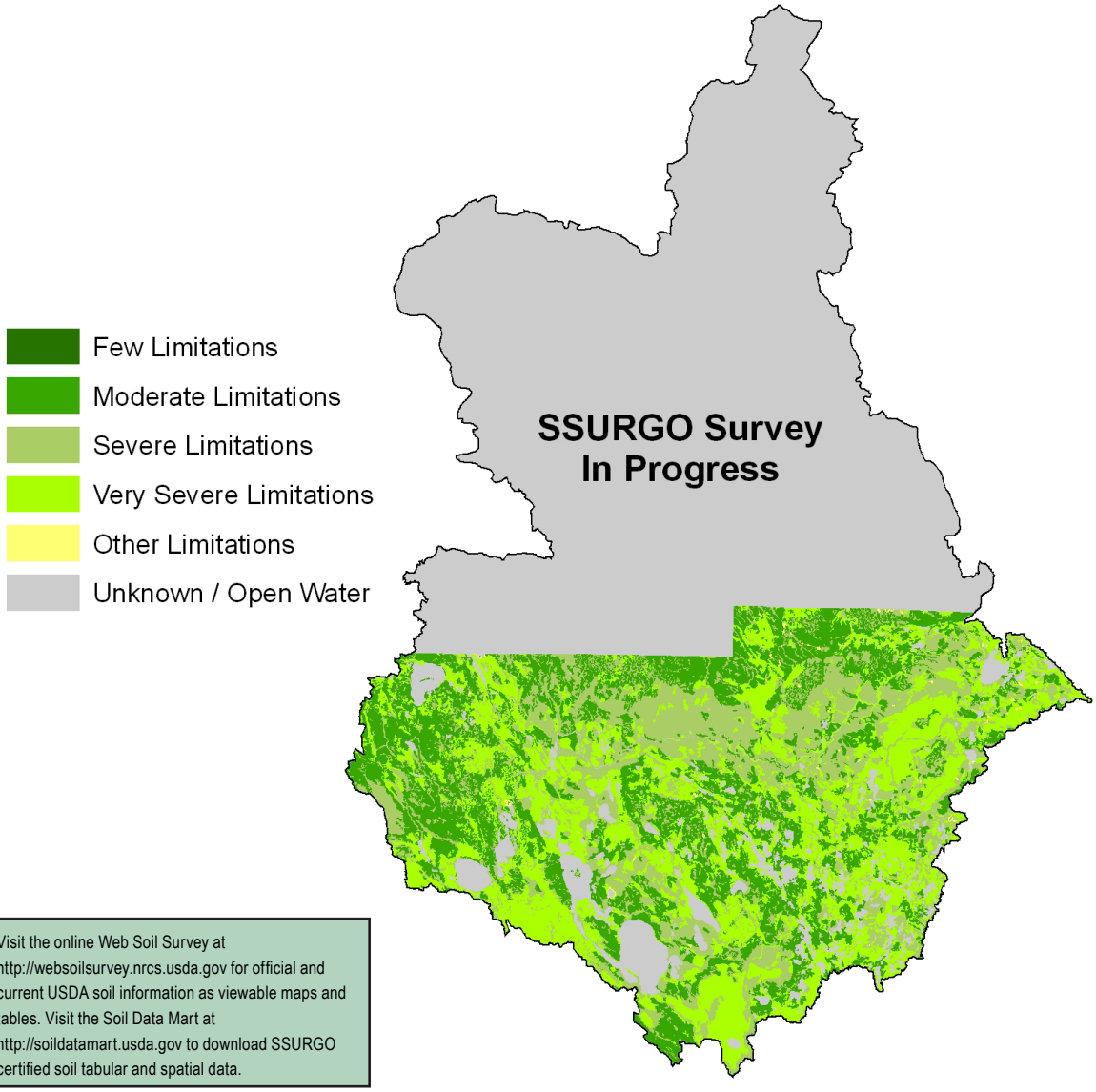


Visit the online Web Soil Survey at http://websoilsurvey.nrcs.usda.gov for official and current USDA soil information as viewable maps and tables. Visit the Soil Data Mart at http://soildatamart.usda.gov to download SSURGO certified soil tabular and spatial data.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management.

The criteria used in grouping the soils does not include major and generally expensive land forming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.



Visit the online Web Soil Survey at http://websoilsurvey.nrcs.usda.gov for official and current USDA soil information as viewable maps and tables. Visit the Soil Data Mart at http://soildatamart.usda.gov to download SSURGO certified soil tabular and spatial data.

Performance Results System Data

Watershed Name: Big Fork				Watershed Number: 09030006						
PRS Performance Measures	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	TOTAL
Total Conservation Systems Planned (acres)	0	5	0	0	0	N/A	0	0	0	5
Total Conservation Systems Applied (acres)	0	5	0	0	0	N/A	0	0	0	5
Conservation Practices										
Total Waste Management (313) (numbers)	0	0	0	0	0	0	0	0	0	0
Riparian Forest Buffers (391) (acres)	0	0	0	0	0	0	0	0	0	0
Erosion Control Total Soil Saved (tons/year)	24	133	28	0	0	N/A	N/A	N/A	N/A	185
Total Nutrient Management (590) (Acres)	0	0	0	0	0	0	0	0	0	0
Pest Management Systems Applied (595A) (Acres)	0	0	0	0	0	0	0	0	0	0
Prescribed Grazing 528a (acres)	0	0	0	0	0	0	0	0	0	0
Tree & Shrub Establishment (612) (acres)	0	18	650	0	0	0	0	0	0	668
Residue Management (329A-C) (acres)	0	0	0	0	0	0	0	0	0	0
Total Wildlife Habitat (644 - 645) (acres)	0	0	25	0	0	0	0	0	0	25
Total Wetlands Created, Restored, or Enhanced (acres)	0	0	0	0	0	0	0	0	0	0
Acres enrolled in Farmbill Programs										
Conservation Reserve Program	0	0	48	0	0	N/A	0	0	0	48
Wetlands Reserve Program	0	0	0	0	0	N/A	0	0	0	0
Environmental Quality Incentives Program	0	0	35	0	0	N/A	0	0	0	35
Wildlife Habitat Incentive Program	0	0	0	0	0	N/A	0	0	0	0
Farmland Protection Program	0	0	0	0	0	N/A	0	0	0	0

THREATENED AND ENDANGERED SPECIES /14

NRCS assists in the conservation of threatened and endangered species and avoids or prevents activities detrimental to such species. NRCS' concern for these species includes the species listed by the Secretary of the Interior (as published in the Federal Register) and species designated by state agencies. The following is a list of threatened, endangered, candidate species and species of special concern that occur in the basin.

Scientific Name	Common Name	Type
Acipenser fulvescens	Lake Sturgeon	Zoological
Botrychium lanceolatum	Triangle Moonwort	Botanical
Botrychium mormo	Goblin Fern	Botanical
Botrychium rugulosum	St. Lawrence Grapefern	Botanical
Buteo lineatus	Red-shouldered Hawk	Zoological
Carex exilis	Coastal Sedge	Botanical
Cladium mariscoides	Twig-rush	Botanical
Cypripedium arietinum	Ram's-head Lady's-slipper	Botanical
Drosera anglica	English Sundew	Botanical
Drosera linearis	Linear-leaved Sundew	Botanical
Haliaeetus leucocephalus	Bald Eagle	Zoological
Hemidactylium scutatum	Four-toed Salamander	Zoological
Ichthyomyzon fossor	Northern Brook Lamprey	Zoological
Lasmigona compressa	Creek Heelsplitter	Zoological
Lasmigona costata	Fluted-shell	Zoological
Ligumia recta	Black Sandshell	Zoological
Malaxis monophyllos var. brachypoda	White Adder's-mouth	Botanical
Najas gracillima	Thread-like Naiad	Botanical
Platanthera clavellata	Club-spur Orchid	Botanical
Potamogeton vaseyi	Vasey's Pondweed	Botanical
Ranunculus lapponicus	Lapland Buttercup	Botanical
Rhynchospora capillacea	Hair-like Beak-rush	Botanical
Rhynchospora fusca	Sooty-colored Beak-rush	Botanical
Salix maccalliana	Mccall's Willow	Botanical
Sparganium glomeratum	Clustered Bur-reed	Botanical
Subularia aquatica	Awlwort	Botanical
Synaptomys borealis	Northern Bog Lemming	Zoological
Torreyochloa pallida	Torrey's Manna-grass	Botanical
Waldsteinia fragarioides	Barren Strawberry	Botanical

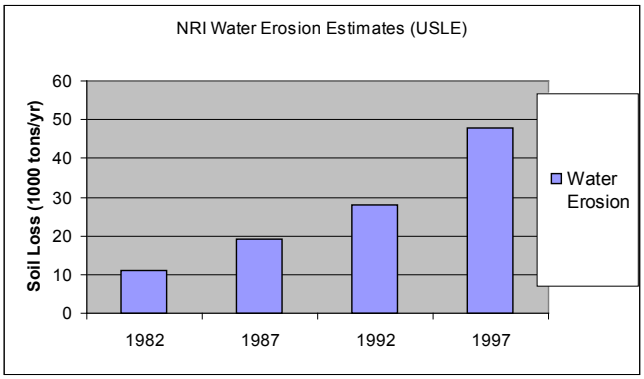
Resource Concerns

County Soil and Water Conservation Districts have identified the following resource concerns as top priorities for conservation and cost sharing efforts:

- **Soil Quality, Excessive Erosion.** Soil erosion from exposed surface areas, logging sites, streambank and lakeshore areas, and roadside erosion are considerable conservation issues in the watershed.
- **Management of Excessive Wetness:** The nature of much of the basin's soils limits productivity and viability of land for agricultural and some silvicultural uses. Efforts such as ditching, species selection, critical planting, and wetland mitigation aid in combating the wetness common to the area.
- **Surface Water Quality:** Enhancement of surface waters. Excessive amounts of sediments, nutrients, and bacteria degrade the water quality causing a fish community with depressed populations and limited diversity. Reduction of priority pollutants and sediments in surface waters will enhance economic development opportunities by preserving the environmental features that promote and attract tourists and fishermen to the area an improve the quality of water supply in the region.
- **Wetland Management.** Physical changes have taken place, wildlife and plant species composition have been altered, greatly changing the function and value of the areas plentiful wetlands. Establishing high priority wetland areas and enforcing future wetlands legislation provides opportunities to enhance the wetland resources of the watershed.
- **Short Growing Season:** Given the short growing season, timely planting, management of moisture, and appropriate seed selection is crucial for a successful crop. Planting delay and short-time concentrated precipitation in the growth season are the main causes of yield reduction.
- **Woodland Management.** Management opportunities include planting trees or shrubs, timber stand improvement, timber sales, enhancing wildlife habitat, prescribed burning, control of invasive species, and other conservation measures.

NRI Erosion Estimates[13]

- NRI estimates for sheet and rill erosion in the watershed increased by approximately 37,100 tons of soil per year between 1982 and 1997.



Socioeconomic and Agricultural Data

The Big Fork subbasin has an estimated population of 5,437 people. Median household income throughout the district is $33,265 annually, roughly 72% of the national average. Unemployment in the subbasin is estimated at 6.3%, and approximately 11% of the residents in the watershed live below the national poverty level.

Estimates indicate 257 Farms in the Big Fork watershed. Approximately 55 percent of the operations are less than 180 acres in size, 41 percent are 180 to 1,000 acres in size, and the remaining farms are greater than 1,000 acres. Average farm size in the basin is 90 acres. Of the 238 operators in the basin, 46 percent are full-time producers not reliant on off farm income.

	(MN) HUC# 9030006	Total Acres:	1,326,975
Population Data*	Watershed Population	5,437	
	Unemployment Rate	6.3%	
	Median Household Income	33,265	
	% below poverty level	11%	
	Median Value of Home	71,400	
Farm Data	# of Farms	257	
	# of Operators	238	**Percent**
	# of Full Time Operators	109	46%
	# of Part Time Operators	129	54%
	Total Cropland Acres	**33,129**	2.5%
Farm Size	1 to 49 Acres	47	18%
	50 to 179 Acres	95	37%
	180 to 499 Acres	80	31%
	500 to 999 Acres	24	10%
	1,000 Acres or more	8	3%
	Average Farm Size	**90**	
Livestock & Poultry	Cattle - Beef	2,628	30%
	Cattle - Dairy	144	2%
	Chicken	1,091	12%
	Swine	113	1%
	Turkey	29	0%
	Other	4,894	55%
	Animal Count Total:	**8,899**	
	Total Permitted AFOs:	**18**	
Chemicals (Acres Applied)	Insecticides	38	
	Herbicides	1,876	
	Wormicides	0	
	Fruiticides	40	
	Total Acres Treated	**1,955**	
	% State Chemical Totals	**0.0%**	

* Adjusted by percent of HUC in the county or by percent of block group area in the HUC, depending on the level of data available

Watershed Projects, Plans and Monitoring

- Long-term water quality monitoring in the Greater Rainy River Watershed. The Northeast Region Sustainable Development Partnership joined with the Minnesota DNR and seven partners in both Canada and the United States to support water quality monitoring and environmental education involving an interagency, inter-scholastic and international cooperation. Koochiching County Environmental Services is the project coordinator. The sponsoring entity was the Rainy / Rapid River Board

- Local River Planning, MN DNR. This project assisted local units of government in the wise management of rivers within their jurisdiction. Collaborative teams created river plans -- consisting of land use zoning criteria, recreational objectives, water quality considerations, and historic/cultural recommendations for the St. Louis, Cloquet, Whiteface, Rainy, and Rapid rivers. These locally designed plans all contain more restrictive zoning provisions than the statewide standards and are tailored to specific local needs and concerns.

- Bigfork Management Project, USDA Forest Service. Completed Environmental Assessment. Project has culminated in the preparation of completed environmental analyses and decision documents for portions of Chippewa National FOrest related to or occuring within the Big Fork watershed. These decision documents include Records of Decision (ROD), Decision Notices (DN), and Decision Memos (DM). Findings of No Significant Impacts will be included in this category as well.

- Rainy / Rapid River Plan, MPCA and International Joint Commission. Goals may include delineation of specific stream segments to be restored or protected, loading reductions to be achieved, type and amount of habitat to be restored, identification of water management issues and problems, conservation district goals, priority issues and waters, and coordination of citizen monitoring programs and efforts.

Conservation Districts, Organizations & Partners

- **Big Fork River Board**
  57565 County Rd. 29, Northome, MN 56661
  Phone - 218-659-4511

- **BWSR Regional Office**
  394 S Lake Ave Rm 403 Duluth, MN 55802
  Phone 218-723-4752

- **Koochiching County SWCD**
  715 4th St International Falls, MN 56649
  Phone 218-283-1174

- **Itasca County SWCD**
  1889 East Highway 2, Grand Rapids, MN 55744 •
  Phone: 218-326-0017

- **Laurentian Resource Conservation and Development Council**
  4850 Miller Trunk Hwy, Suite 2A Duluth, MN 55811
  Phone (218) 720-5225

- **MPCA Regional Office - Duluth**
  525 Lake Avenue S. # 400 Duluth, MN 55802
  Phone 218-723-4660 or 800-657-3864

- MN **DNR Area Hydrologist**
  1201 E. Hwy. 2 Grand Rapids, MN 55744
  Phone 218-327-4263

- **U of MN Extension Service Regional Office**
  1307 3rd St. NE, Suite 102 Roseau, MN 56751
  Phone 218-463-0291 or 888-241-4546

- **Rainy River First Nations**
  Box 450 Emo, ON P0W 1E0
  Phone 807-482-2479 Fax: (807) 482-2603

- **Rainy River Basin Water Resources Center**
  Rainy River Community College
  1501 Highway 71 International Falls, MN 56649
  Phone 218-285-2218

Footnotes / Bibliography

1. Ownership Layer – Source: MN Stewardship Data: Minnesota Department of Natural Resources, Section of Wildlife, BRW, Inc, 2007. This is the complete GAP Stewardship database containing land ownership information for the entire state of Minnesota. Date of source material is variable and ranges from 1976 to 2007, although a date range of 1983 to 1985 predominates. Land interest is expressed only when some organization owns or administers more than 50% of a forty except where DNR could create sub-forty accuracy polygons.

2. National Land Cover Dataset (NLCD) - Originator: U.S. Geological Survey (USGS); Publication date: 19990631; Title: Minnesota Land Cover Data Set, Edition: 1; Geospatial data presentation form: Raster digital data; Publisher: U.S. Geological Survey, Sioux Falls, SD, USA.

3. Ownership layer classes grouped to calculate Public ownership vs. Private and Tribal ownership by Minnesota NRCS Rapid Watershed Assessment Staff. Land cover / Land use data was then extracted from the National Landcover Dataset Classification System and related to ownership class polygons.

4. U.S. Geological Survey National Hydrography Dataset (NHD) 1:100,000-scale Digital Line Graph (DLG) medium resolution hydrography data, integrated with reach-related information from the U.S. Environmental Protection Agency Reach File Version 3.0 (RF3). The Hydro 100k layer was compared to MPCA's 303(d) data to derive percentage of listed waters.

5. Land Cover / Land Use / Hydro 100k Buffer. Using the 100k Hydrology dataset, All streams within HUC were spatially buffered to a distance of 100 ft. National Landcover Dataset attributes were extracted for the spatial buffer to demonstrate the vegetation and landuse in vulnerable areas adjacent to waterways.

6. Land Capability Class. ESTIMATES FROM THE 1997 NRI DATABASE (REVISED DECEMBER 2000) REPLACE ALL PREVIOUS REPORTS AND ESTIMATES. Comparisons made using data published for the 1982, 1987, or 1992 NRI may produce erroneous results. This is because of changes in statistical estimation protocols and because all data collected prior to 1997 were simultaneously reviewed (edited) as 1997 NRI data were collected. All definitions are available in the glossary. In addition, this December 2000 revision of the 1997 NRI data updates information released in December 1999 and corrects a computer error discovered in March 2000. For more information: http://www.nrcs.usda.gov/technical/NRI/

7. 1997 NRI Irrigated Land Estimates. Irrigated land: Land that shows evidence of being irrigated during the year of the inventory or during two or more years out of the last four years. Water is supplied to crops by ditches, pipes, or other conduits. Water spreading is not considered irrigation; it is recorded as a conservation practice. [NRI-97] For more information: http://www.nrcs.usda.gov/technical/NRI/

8. 303(d) Stream data. Minnesota's Final Impaired Waters (per Section 303(d) Clean Water Act), 2006. Data obtained from Minnesota Pollution Control Agency (MPCA). The Minnesota Pollution Control Agency (MPCA) helps protect state water by monitoring quality, setting standards and controlling inputs through the development of TMDL plans. http://www.pca.state.mn.us/water/tmdl/index.html#maps.

Footnotes / Bibliography (continued)

9. National Coordinated Common Resource Area (CRA) Geographic Database. A Common Resource Area (CRA) map delineation is defined as a geographical area where resource concerns, problems, or treatment needs are similar. It is considered a subdivision of an existing Major Land Resource Area (MLRA) map delineation or polygon. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographic boundaries of a Common Resource Area

10. Soil Survey Geographic Database (SSURGO) Tabular and spatial data obtained from NRCS Soil Data Mart at http://soildatamart.nrcs.gov. Publication dates vary by county. Component and layer tables were linked to the spatial data via SDV 5.1 and ARCGIS 9.1 to derive the soil classifications presented in these examples. Highly Erodible Land Classification Data obtained from USDA/NRCS EFOTG Section II, County Soil Data. HEL classifications were appended to SSURGO spatial data via an ARCEdit session. Addendum and publication dates vary by county.

11. Lands removed from production through farm bill programs. County enrollment derived from the following: CRP Acres: www.fsa.usda.gov/crpstorpt/07Approved/r1sumyr/mn.htm (7/30/04). CREP Acres: http://www.bwsr.state.mn.us/easements/crep/easementsummary.html (7/31/03). WRP Acres: NRCS (8/16/04). Data were obtained by county and adjusted by percent of HUC in the county.

12. Socioeconomic and Agricultural Census Data were taken from the U.S. Population Census, 2000 and 2002 Agricultural Census and adjusted by percent of HUC in the county or by percent of zip code area in the HUC, depending on the level of data available. Data were also taken from MPCA AFO/CAFO counts provided by county for 2005.

13. 1997 NRI Estimates for sheet and rill erosion (WEQ & USLE). The NRI estimates sheet and rill erosion together using the Universal Soil Loss Equation (USLE). The Revised Universal Soil Loss Equation (RUSLE) was not used in the 1997 NRI. RUSLE was not available for previous inventories, therefore the use of USLE was continued to preserve the trending capacity of the NRI database. Wind erosion is estimated using the Wind Erosion Equation (WEQ). For further information visit http://www.mn.nrcs.usda.gov/technical/nri/findings/erosion.htm

14. Federally listed endangered and threatened species counts obtained from NRCS Field Office Technical Guide, Section II, Threatened and Endangered List. http://www.nrcs.usda.gov/Technical/efotg/. Where listed, Essential fish habitat as established by Magnuson-Stevens Fishery Conservation and Management Act, Public Law 94-265, as amended through October 11, 1996 http://www.nmfs.noaa.gov/sfa/magact/

15. Watershed Projects, Plans, Monitoring. Natural Resources Conservation Service, Watershed Projects Planned and Authorized, http://www.nrcs.usda.gov/programs/watershed/Purpose. Additional Information on listed individual projects can be obtained from the noted parties.